

I claim:

1. A master cylinder having a housing with a first and second bore therein, said first and second bores supplying a same braking system with pressurized fluid to effect a brake application, said first bore retaining a first piston to define a first chamber; said second bore retaining a second piston to define a second chamber; said first and second pistons being connected to an input member to receive an actuation force to effect the brake application, said first piston being characterized by a first cylindrical member that is connected to second cylindrical member by a shaft, said shaft having a peripheral surface with an actuation ramp that terminates at an apex with a retraction ramp, said second piston engaging said connecting shaft, said second cylindrical member upon receipt of an actuation force moving said first cylindrical member in said first chamber through said shaft and moving said second piston through the engagement of said second piston with said actuation ramp to respectively and simultaneously communicate first and second volumes of fluid to said braking system until said engagement of said second piston reaches said apex and as a result a pre-determined volume of fluid has been displaced from said second chamber such that thereafter exclusive communication of fluid to the brake system occurs from said first chamber to said braking system to effect a brake application; said second piston's movement being controlled by the sequential engagement of said actuation ramp, apex, and retraction second ramp such that communication of fluid from said second chamber only occurs while said second piston engages said actuation ramp and termination of communication of fluid from said second chamber occurs once said second piston reaches the apex and the pressure in said second chamber is eliminated with the engagement of the second piston with the retraction ramp.

2. The master cylinder as recited in claim 1 wherein said first and second bores are characterized by being in a perpendicular alignment with respect to one another.

3. The master cylinder as recited in claim 1 wherein said actuation and retraction ramps extend radially from the connecting shaft.

4. The master cylinder as recited in claim 1 wherein said second chamber contains a volume greater than said first chamber by a ratio of 2:1.

5. The master cylinder as recited in claim 1 wherein said actuation ramp has a slope of approximately 30 degrees.

6. The master cylinder as recited in claim 1 wherein said retraction ramp has a slope of approximately -60 degrees to rapidly terminate fluid pressure in said second chamber and prevent side loading of said shaft.

7. The master cylinder as recited in claim 1 wherein said retraction ramp has a length that is shorter than the actuation ramp.

8. The master cylinder as recited in claim 1 further including a check valve located between said second chamber and said braking system to prevent communication of volume of fluid from said first chamber to said second chamber when the engagement of said second piston reaches the apex on said shaft.

9. The master cylinder as recited in claim 1 further including a roller that is attached to said second piston and engages said actuation and retraction ramps.

10. The master cylinder as recited in claim 9 wherein the pressure in said second chamber approaches that of the reservoir when said roller engages said retraction ramp.

11. The master cylinder as recited in claim 1 wherein said any side loading of said shaft is essentially eliminated with the occurrence of the engagement of said second piston with the retraction ramp.

12. The master cylinder as recited in claim 1 wherein said actuation ramp has a non-linear surface such that the movement of said second piston in communicating the second volume to the brake system may vary according to the position of the shaft with respect to the first chamber.

13. The master cylinder as recited in claim 1 wherein said engagement of said second piston with said retraction ramp result in a diversion of the actuation force from the second piston back to the first piston during a brake application.

14. The master cylinder as recited in claim 1 wherein the engagement of said shaft and second piston occurs in a said housing in a chamber that is essentially at reservoir pressure.